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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,012	09/19/2003	Jihong Chen	TI 35554	9126
23494	7590	11/16/2004	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			WOJCIECHOWICZ, EDWARD JOSEPH	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/667,012

Applicant(s)

CHEN ET AL.

Examiner

Edward Wojciechowicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 15-23 and 26-28 is/are rejected.
- 7) ☒ Claim(s) 13, 14, 24 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12, 15-23, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gauthier et al, and further in view of De et al and Wu et al. The invention recites a method for forming an FET structure having a halo implant and a compensation implant proximate the halo implant, where the compensation implant is implanted at an oblique angle to the substrate surface, so as to push the compensation implant farther under the gate sidewall spacers.

This basic inventive concept and process is taught by Gauthier, as shown, for example, in Fig. 3, with a compensation implant (38) that can be formed at "any angle" (col. 4, l. 58), and extends under the sidewall spacers, and also counter dopes the halo implant (36a). Since Gauthier teaches that this compensation implant may be formed at any angle, depending on the desired end configuration, the specific angles claimed would be within the scope of Gauthier's teaching. In addition, Gauthier also teaches that the compensation implant may be formed at impurity concentrations within the same order of magnitude as claimed. Gauthier also shows such features as lightly doped drain implants (35) along with heavily doped source/drain implants (31). Furthermore, since Gauthier forms different embodiments of his device where the compensation implant may extend across a wide dimensional range, from outside the gate electrode, as in Fig. 6, to well beneath the gate electrode, as shown in Fig. 7, applicants' claim limitation that the compensation implant should extend at least 10 nm under the gate sidewall spacers, would automatically be met.

While Gauthier teaches most of the inventive structure and method, he does not explicitly allow for the formation of the source/drain regions after the compensation implant is introduced, as recited in

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claim 1. Consequently, De et al is cited to teach that forming these regions after the other implants are formed is also well known in the art. See, for example, the discussion in De at col. 18, l. 46, where De mentions that the source/drain regions may be added before or after the angled implants.

Likewise, Gauthier does not explicitly disclose the use of an interlevel dielectric layer, as recited in claim 16. However, Wu is cited to show that such the use of such a dielectric layer is also well known in the art. See, for example, the discussion at col. 5, l.58 of Wu. One would be motivated to incorporate this feature into the device of Gauthier so as to provide increased device stability.

With regard to claim 26, De clearly discloses the formation of additional devices in proximity to the main FET structure.

#### ***Allowable Subject Matter***

Claims 13, 14, 24 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward Wojciechowicz whose telephone number is 571-272-1739. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'E. Wojciechowicz', with a long horizontal flourish extending to the right.

Edward Wojciechowicz  
Primary Examiner  
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EW: ew